



Fernald Preserve, Fernald, Ohio

Comprehensive Legacy Management and Institutional Controls Plan Volumes I and II

January 2008



U.S. Department
of Energy

Office of Legacy Management

**Comprehensive
Legacy Management and
Institutional Controls Plan**

Volumes I and II

**Fernald Preserve
Fernald, Ohio**

January 2008

Volume I

Legacy Management Plan

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U.S. Department of Energy

**Revision 2
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Emergency Contact

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Comprehensive Legacy Management and Institutional Controls Plan, Revision 2

Significant Changes Summary

Section	Description of Modification	Driver/Technical Information
Volume I		
Section 1	Added information concerning the implementation of the DOE-LM Environmental Management System to Section 1.2.	Executive Order 13423. DOE Order 450.1, Environmental Protection Program.
Section 2	Updated Section 2.2.3 Current Conditions.	July 2007 response to OEPA comment 1.
	Updated Figure 1 with current flyover picture.	
	Corrected line spacing of indented paragraph.	March 2007 response to OEPA comment 4.
	Updated Figure 2 with current flyover picture.	
	Updated Section 2.4.4 Uncertified Areas to discuss 60-Main Drainage Corridor culvert and adjacent 18-inch culvert.	March 2007 response to OEPA comment 5.
	Corrected reference to Figure 4 on Figure 3.	March 2007 response to OEPA comment 7.
	Inserted Figure 4 - Uncertified Subsurface Utilities.	July 2007 response to OEPA comments 2 and 3.
Section 3	No significant changes.	
Section 4	No significant changes.	
Section 5	Corrected typographical error.	March 2007 response to OEPA comment 8.
	Clarified the information provided.	March 2007 response to OEPA comment 9.
	Updated the LM website address.	March 2007 response to OEPA comment 11.
Section 6	Simplified the funding information provided.	
Appendix A	Removed the Summary Legacy Management Budget Estimate table.	
Volume II		
Section 1	No significant changes.	
Section 2	Updated Figure 1 with current flyover picture.	March 2007 response to OEPA comment 15 and 16.
	Discussed the Interim Residual Risk Assessment Report.	
	Corrected line spacing of indented paragraph.	March 2007 response to OEPA comment 4.
	Inserted text concerning the inspection of the 60-Main Drainage Corridor culvert and adjacent 18-inch culvert.	March 2007 response to OEPA comment 14.
	Revised the site inspection process.	Inspection approach revised following one year of quarterly inspection experience and following OEPA comment on the March and June 2007 quarterly site inspections.
Section 3	Revise mowing and baling frequency from annually to a 3-year rotation for established cell caps. Updated text to reflect revised inspection process.	Inspection approach revised following one year of quarterly inspection experience and following OEPA comment on the March and June 2007 quarterly site inspections.

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Significant Changes Summary

Section	Description of Modification	Driver/Technical Information
Volume II (cont.)		
Section 4	No significant changes.	
Section 5	Added Fernald Community Alliance to Section 5.2.1.	March 2007 response to OEPA comment 20.
	Updated information regarding the status of FRESH.	March 2007 response to OEPA comment 21.
	Added text describing the University of Cincinnati's role in the Visitors Center design.	March 2007 response to OEPA comment 23.
Appendix A	Revised Figure 3-1.	March 2007 response to OEPA comment 24.
	Revised Figure 3-3.	March 2007 response to OEPA comment 25.
Appendix B	No changes.	
Appendix C	Updated Fernald Preserve contact information.	
Appendix D	Revised OSDF Inspection Checklist.	Checklist was developed prior to closure. Revisions are more applicable to current inspection and reporting conditions.
Attachment A - OMMP		
Section 1	Revised 1 st paragraph to indicate the OMMP became part of the LMICP in January 2006.	
Section 2	No changes.	
Section 3	Minor text edits, Figure 3-7 updated through 2006.	
Section 4	Section 4.1.1: Revised text to reflect current leachate flow volume.	Flow volume has decreased since last revision.
	Table 4-1: Corrected Ops Well IDs for Waste Pits extraction wells.	
Section 5	Section 5.2.1: Updated to reflect current ion exchange resin changeout practice.	Previous resin changeout practice no longer appropriate given the plant's excess treatment capacity.
	Section 5.7: Updated to reflect current practice of reviewing sample results.	
Section 6	Section 6.2.3.1: Updated to reflect current maintenance tracking method.	Previous tracking method was no longer cost effective.
	Section 6.3: Updated based on current information.	
	Section 6.3.2: Updated to reflect current information.	
Section 7	Updated to reflect the Site's current organizational responsibilities.	
Attachment B - PCCIP		
Section 1	Incorporate PCCIP into the LMICP. It will no longer be referred to as a stand alone document.	Not required to be a stand-alone plan.
Section 2	No significant changes.	
Section 3	No significant changes.	
Section 4	No significant changes.	
Section 5	No significant changes.	
Section 6	No significant changes.	
Section 7	No significant changes.	

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Section	Description of Modification	Driver/Technical Information
Attachment B - PCCIP (cont.)		
Section 8	Revise mowing and baling frequency from annually to a 3-year rotation for established cell caps. Updated text to reflect revised inspection process.	Revised mowing approach more accurately mimics a prescribed burn rotation.
Section 9	No significant changes.	
Section 10	No significant changes.	
Section 11	Deleted modification process.	Modifications will be conducted through LMICP review.
Section 12	No significant changes.	
Attachment C - GWLMP		
Section 1	No significant changes.	
Section 2	No significant changes.	
Section 3	Temporary exclusion of control charts from SER reports.	Letter to EPA/OEPA dated April 19, 2007, "Exclusion of the Control charts for the Onsite Disposal Facility Leak Detection Program from the 2006 Site Environmental Report. OEPA concurrence, letter dated May 21, 2007.
	Proposal: End annual Appendix I and PCB sampling at LCS, pending EPA/OEPA approval of the Common Ion Study and finalization of a refined baseline.	OSDF is not operating, Common Ion Study is ending, refined baseline will be finalized soon.
Section 4	No significant changes.	
Section 5	No significant changes.	
Section 6	No significant changes.	
Appendix A	No changes.	
Appendix B	Cessation of sampling for common ions.	Eight round of sampling were required, which were met at the end of 2007.
	Proposal: Reduce sampling frequency for LCS, LDS, HTW, and GMA Wells from quarterly to semi annual beginning Jan 1, 2008.	Sufficient samples have been collected to support the Common Ion Study.
	Sampling for 1,1-dichloroethene in Cell 3 LCS will continue until results have been further evaluated using new method proposed in 2006 SER. Sampling of 1,1-dichloroethene in Cell 3 LDS has stopped.	Based on sampling results reported in 2006 SER.
	Revised requirements for filtering of groundwater samples.	Review of historical data indicated no significant concentration difference between filtered and unfiltered sample results.
	Eliminated the collection of field blanks.	Not required by the LM QAPP.

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Section	Description of Modification	Driver/Technical Information
Attachment C - GWLMP (cont)		
Appendix C	No significant changes.	
Appendix D	Section 2.0: Updated to reflect current system operation.	Facility closure in 2006.
	Section 3.0 & Table 1: Updated to reflect current inspection and maintenance activities that have changed since the facility was closed in 2006. The most significant change is that the annual LCS/LDS line camera inspection will no longer be done as the regulation requiring the inspection is no longer applicable, since the facility closed in 2006.	Facility closure in 2006.
	Section 5.0: Cell specific leachate flow rates and associated days to accumulate the volume that equals 1 foot of head on primary liner were updated to reflect current conditions.	Leachate flow rates have decreased since the last LMICP revision.
Appendix E	Included two new figures presenting a strategy for statistical evaluation of sampling results.	Figures and new strategy presented in 2006 SER.
Attachment D - IEMP		
Section 1	Incorporate IEMP into the LMICP. It will no longer be referred to as a stand alone document.	Not required to be a stand-alone plan.
Section 2	No significant changes.	
Section 3	Replaced 10-year time of travel footprint with Waste Storage Area (Phase II) Remediation footprint.	Current aquifer remedy system design based on the Waste Storage Area (Phase II) Design.
	Removed Direct Push Locations 12367 and 12371 from annual direct-push sampling program.	Locations are no longer located in the 30 ug/L total U plume.
	Field filter samples from Waste Storage Area Monitoring Well 2010.	Monitoring well has a historical record of being biofouled.
	Updated tense of text throughout section to reflect post closure status.	Site is currently in post closure.
Section 4	Added 5 additional surface water sampling locations. Updated Figure 4-2 to include the 5 locations.	July 2007 response to OEPA comment 4.
	Proposal: Remove radionuclides from sampling for IEMP characterization requirements.	Review of historical data indicated these constituents' concentrations have always been well below the FRL.
	For low level mercury analysis, all sampling equipment is sent to an offsite laboratory for decontamination and certification of cleanliness.	To clarify and align the IEMP with the analytical method requirements.
Section 5	No significant changes.	
Section 6	Update list of regulatory drivers to those that are applicable post-closure.	
Section 7	No significant changes.	
Appendix A	Replaced 10-year time of travel footprint with Waste Storage Area (Phase II) Remediation footprint.	Current aquifer remedy system design based on the Waste Storage Area (Phase II) Design.
	Updated tense of text throughout section to reflect post closure status.	Site is currently in post closure.

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Significant Changes Summary

Section	Description of Modification	Driver/Technical Information
Attachment D - IEMP (cont.)		
Appendix B	No changes.	
Appendix C	No significant changes.	
Appendix D	Added one year of wetland mitigation monitoring to the A-6PI wetlands.	Extended monitoring due to drought conditions experienced in 2007.
Attachment D.1	Deleted Attachment D.1, Sloan's Crayfish Management Plan.	Plan is no longer anticipated to be needed, since remedial activities are complete.
Attachment E - CIP		
NA	Updated Section 4.2 - Interested Community Members, Local, City, and State Elected Officials.	March 2007 response to OEPA comment 37.
NA	Updated CIP Appendix A with the most current information.	March 2007 response to OEPA comment 38.

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Acronyms and Abbreviations

AEC	Atomic Energy Commission
AR	Administrative Record
CAWWT	converted advanced waste water treatment facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
DOE	U.S. Department of Energy
DOE-LM	U.S. Department of Energy Office of Legacy Management
EMS	Environmental Management System
EPA	Environmental Protection Agency
FCP	Fernald Closure Project
ft	feet/foot
FFCA	Federal Facilities Compliance Agreement
FIU	Florida International University
FMPC	Feed Materials Production Center
FRL	final remediation level
IC Plan	Institutional Controls Plan
IEMP	Integrated Environmental Monitoring Plan
LCS	leachate collection system
LDS	leak detection system
LMICP	Comprehensive Legacy Management and Institutional Controls Plan
NARA	National Archives and Records Administration
OEPA	Ohio Environmental Protection Agency
OMMP	Operations and Maintenance Master Plan
OSDF	on-site disposal facility
PCCIP	Post-Closure Care and Inspection Plan
PDF	portable document file
ppb	parts per billion
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SEP	Site-Wide Excavation Plan
UF4	uranium tetrafluoride
UNH	uranyl nitrate hexahydrate
UO3	uranium trioxide
WAC	waste acceptance criteria

End of current text

Executive Summary

This Comprehensive Legacy Management and Institutional Controls Plan (LMICP) was developed to document the planning process and the requirements for the long-term care, or legacy management, of the Fernald Preserve. The LMICP became effective when the Department of Energy (DOE) Office of Environmental Management made its determination of reasonableness on Fluor Fernald Inc.'s declaration of physical completion. It serves the same function as the Long-Term Surveillance and Maintenance Plan used at other DOE Legacy Management sites. The LMICP is a two-volume document with supporting documents included as attachments to Volume II. Volume I provides the planning details for the management of the Fernald Preserve that go beyond those identified as institutional controls in Volume II. Primarily, Volume II is a requirement of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), providing institutional controls that will ensure the cleanup remedies implemented at the Fernald Preserve will protect human health and the environment. The format and content of Volume II follows U.S. Environmental Protection Agency (EPA) requirements for institutional controls. Volume II is enforceable under CERCLA authority.

Volume I is the Legacy Management Plan. This plan is not a required document under the CERCLA process; it is not a legally enforceable document. It provides the DOE Office of Legacy Management's (DOE-LM's) management plan for maintaining the Fernald Preserve and fulfilling DOE's commitment to maintain the Fernald Preserve following closure. The plan discusses how DOE, specifically DOE-LM, will approach the legacy management of the Fernald Preserve. It describes the surveillance and maintenance of the entire site, including the on-site disposal facility (OSDF). It explains how the public will continue to participate in the future of the Fernald Preserve. Also included in the Legacy Management Plan is a discussion of records and information management. The plan ends with a discussion of funding for legacy management of the site.

Volume II is the Institutional Controls Plan (IC Plan). The IC Plan is required under the CERCLA remediation process when a physical remedy does not allow for full, unrestricted use or when hazardous materials are left on site. The plan is a legally enforceable CERCLA document and part of the remedy for the site (an EPA requirement). The plan outlines the institutional controls that are established for and enforced across the entire site, including the OSDF, to ensure that human health and the environment continue to be protected following the completion of the remedy. The IC Plan has five attachments that lend support to and provide details regarding the established institutional controls. The attachments provide further information on the continuing groundwater remediation (pump-and-treat) system (Attachment A); the OSDF cap and cover system (Attachment B); the leak detection and leachate management systems for the OSDF (Attachment C); and the environmental monitoring that will continue following closure (Attachment D). Prior to transition, these four attachments were stand-alone documents with their own review and revision cycle. These documents have since been incorporated into the LMICP and will follow the review and revision cycle identified below. Also attached to Volume II is the Community Involvement Plan (CIP) (Attachment E), a CERCLA-required document, developed by DOE. The CIP explains in detail how DOE will ensure that the public has appropriate opportunities for involvement in post-closure activities.

Upon approval, it is anticipated that the LMICP will be finalized by January each year, to correspond with calendar-year monitoring and reporting. Between October and January, EPA and Ohio Environmental Protection Agency comments will be addressed.

The future LMICP schedule will be as follows:

- Each June, the annual site environmental report will be submitted. It will make recommendations based on the previous year's monitoring information.
- Each October, an annual review of the LMICP will be submitted. It will identify updates as necessary.
- Each January, the LMICP will be finalized to correspond with the monitoring and reporting schedule.

Pertinent information associated with the CERCLA 5-year reviews will be included in the LMICP revisions as needed.

1.0 Introduction

Legacy management is required at the Fernald Preserve to ensure that the remedial actions implemented at the site continue to be effective and protective of human health and the environment following site closure. This Comprehensive Legacy Management and Institutional Controls Plan (LMICP) outlines the Department of Energy's (DOE's) approach to, and documents the requirements for, the long-term care of the Fernald Preserve. The LMICP serves the same function as the Long-Term Surveillance and Maintenance Plan used at other DOE sites. It is DOE's intent to continue to review and refine the LMICP, with the involvement of community and regulators, to ensure that legacy management activities meet stakeholder and regulatory requirements. All revisions will be subject to Regulatory Agency review and will be made available to the community. Revisions can always be made on an as-needed basis, if the results of site and on-site disposal facility (OSDF) inspections and monitoring require them. The term "legacy management" is used throughout this LMICP and is intended to encompass all activities defined as such in DOE policy and guidance. Legacy management activities were formerly referred to as "stewardship" activities, a term that this LMICP uses interchangeably.

The DOE Office of Legacy Management (DOE-LM) is responsible for ensuring that DOE's post-closure responsibilities are met and for providing DOE programs for long-term surveillance and maintenance, records management, workforce-restructuring and benefits continuity, property management, land-use planning, and community assistance. Additional information regarding DOE-LM can be found at <http://www.lm.doe.gov>.

DOE policy and guidance clearly identify protectiveness of the remedies carried out at the Fernald Preserve (e.g., groundwater, OSDF, institutional controls) as the top priority for legacy management. Specifically, the OSDF requires regular monitoring and maintenance to ensure its integrity and performance. The restored areas of the site also require monitoring to ensure that applicable laws and regulations are followed. Departmental policy and funding priorities regarding legacy management emphasize supporting the remedies as described in Fernald's records of decision (RODs).

1.1 Purpose and Organization of the LMICP

The LMICP provides an overview of the defined end-state maintenance and monitoring requirements as well as the contingencies that are in place to address any changes made to the end state.

The Fernald LMICP has been developed as a two-volume set. This volume—the first—is the Legacy Management Plan, which outlines DOE's approach to legacy management, including such issues as community involvement, records management, and funding. The second volume, the Institutional Controls Plan (IC Plan), outlines the specific surveillance and maintenance requirements for the Fernald Preserve.

There are five support plans included in the LMICP as attachments:

- Attachment A—Operations and Maintenance Master Plan for Aquifer Restoration and Wastewater Treatment (OMMP)

- Attachment B—Post-Closure Care and Inspection Plan (PCCIP)
- Attachment C—Groundwater/Leak Detection and Leachate Monitoring Plan
- Attachment D—Integrated Environmental Monitoring Plan (IEMP)
- Attachment E—Community Involvement Plan (CIP)

These support plans outline the operational requirements associated with the ongoing groundwater remedy (Attachment A); the surveillance and maintenance requirements for the OSDF (Attachment B); surveillance and maintenance for the leachate and groundwater associated with the OSDF (Attachment C); the environmental monitoring requirements necessary to ensure the completion and effectiveness of the remedies (Attachment D); and how DOE will continue to stay in communication with and involve the public in legacy management activities at the Fernald Preserve (Attachment E).

DOE is required to conduct legacy management activities at facilities that have achieved completion of site remediation (refer to Section 1.2). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that institutional controls be part of selected remedies where land-use restrictions are placed on the property. The Fernald Preserve remedies include use restriction, an undeveloped park, waste disposal (the OSDF), and continuing groundwater extraction and treatment. DOE has followed U.S. Environmental Protection Agency (EPA) guidance on institutional controls (refer to Section 1.2). Existing laws, regulations, policies, and directives provide broad requirements for DOE to conduct legacy management activities. These activities include monitoring, reporting, record keeping, and long-term surveillance and maintenance for various facilities and media, including engineered waste disposal units, surface water, and groundwater.

Taking into consideration the future use plans for the Fernald Preserve, the scope of legacy management activities can be divided into three categories: (1) the operation and maintenance of the remedies, (2) surveillance and maintenance in restored areas (areas outside of the OSDF), and (3) public involvement. Legacy management activities related to the maintenance of the remedies include monitoring and maintaining the OSDF, the converted advanced wastewater treatment facility (CAWWT) and supporting infrastructure, the extraction wells and associated piping, and the active outfall line to the Great Miami River. The decontamination and dismantling of the aquifer remediation infrastructure (CAWWT, well system, etc.) is also included in legacy management activities.

The PCCIP (Attachment B) includes detailed information about the OSDF, and the OMMP includes detailed information about the monitoring and maintenance of the CAWWT, groundwater restoration systems, and the active outfall line. Legacy management activities, covering both categories, also include ensuring that remedy-driven restrictions on access to and use of the Fernald Preserve are enforced (for example, records management and education). Surveillance and maintenance in restored areas will focus on protecting natural and cultural resources in accordance with applicable laws and regulations. Legacy management activities related to public involvement include ongoing communication with the public regarding the continuing groundwater remediation, legacy management activities, and the future of the Fernald Preserve. Emphasis will also be placed on educating the public regarding the site's former production activities, its remediation, and its land-use restrictions. Displays and programs at the Visitors Center and outreach programs at local schools and organizations will help DOE-LM meet this objective.

This Legacy Management Plan (Volume I) is organized into the following sections. It describes planned legacy management activities at the Fernald Preserve as well as issues related to stewardship.

Section 1.0 (Introduction)—Provides an introduction to this plan and discusses the purpose and necessity of legacy management at DOE facilities.

Section 2.0 (Site Background)—Provides the history of the Fernald Preserve, beginning with the site’s construction in the 1950s. A discussion of production activities, remediation, and the conditions at the time of closure is also presented.

Section 3.0 (Scope of Legacy Management at the Fernald Preserve)—Discusses the scope of legacy management at the Fernald Preserve, including the management of site property, legacy management of the OSDF, and surveillance and maintenance of restored areas.

Section 4.0 (Oversight of Legacy Management at the Fernald Preserve)—Describes the breakdown of responsibilities for legacy management activities at the Fernald Preserve, including DOE-LM, contractors, regulators, the CERCLA 5-year review, and reporting requirements.

Section 5.0 (Records Management)—Describes the importance of records management and preservation and how they are applicable to legacy management. This section also describes various avenues for records management during legacy management.

Section 6.0 (Funding)—Discusses the funding needed to implement and sustain a legacy management program at the Fernald Preserve.

1.2 Purpose of Legacy Management

In recent years, DOE has increased focus on the need for legacy management following completion of remediation activities. DOE orders and policies that provide the framework for legacy management include the documents listed below. The term “stewardship” is used in the following descriptions. When these documents were prepared, the term “stewardship” was used instead of “legacy management.” As stated above, both terms are used in this Legacy Management Plan and refer to the same process.

- DOE Policy P 454.1, *Use of Institutional Controls* (DOE 2005a), establishes a consistent framework for the use of institutional controls throughout the DOE complex.
- DOE Order 450.1, *Environmental Protection Program* (DOE 2005b), requires the implementation of sound stewardship practices that are protective of the air, the land, water, and other natural and cultural resources affected by DOE operations.
- DOE Order 200.1, *Information Management Program* (DOE 1996a), provides a framework for managing information, information resources, and information technology investment.
- DOE Order 430.1, *Life Cycle Asset Management* (DOE 1995a), and DOE Order 4320.1B, *Site Development Planning* (DOE 1992a), identify the analyses that must be conducted in

order to determine whether a particular portion of DOE real property is considered to be excess and available for transfer to another entity.

- DOE Order 435.1, *Radioactive Waste Management* (DOE 2001a), requires DOE radioactive waste management activities to be systematically planned, documented, executed, and evaluated in a manner that protects workers and the public as well as the environment.
- DOE Order 1230.2, *American Indian Tribal Government Policy* (DOE 1992b), requires DOE sites to consult with potentially affected tribes concerning the effects of proposed DOE actions (including real property transfers), and to avoid unnecessary interference with traditional religious practices.
- DOE Order 5400.5, *Radiation Protection of the Public and the Environment* (DOE 2003), establishes acceptable levels for the release of property on which any radioactive substances or residual radioactive material was present.
- The Secretary of Energy's Land and Facility Use Policy (DOE 1994) and DOE Policy 430.1, *Land and Facility Use Planning Policy* (DOE 1996b), state that DOE sites must consider how best to use DOE land and facilities to support critical missions and to stimulate the economy while preserving natural resources, diverse ecosystems, and cultural resources.
- Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management" (George W. Bush, January 24, 2007), establishes goals in the areas of energy efficiency, acquisition, renewable energy, toxics reduction, recycling, renewable energy, sustainable buildings, electronics stewardship, fleets, and water conservation.

Below are other documents and reports that address legacy management issues across the DOE complex and help to better define the activities that may be required for legacy management purposes. (As mentioned previously, the term "stewardship," instead of "legacy management," is used in the descriptions.)

- *From Cleanup to Stewardship* (DOE 1999a) addresses the nature of long-term stewardship at DOE sites, anticipated long-term stewardship at DOE sites, and planning for long-term stewardship.
- *A Report to Congress on Long-Term Stewardship* (DOE 2001b), required by the fiscal year 2000 National Defense Authorization Act, represents the most comprehensive compilation of DOE's expected long-term stewardship obligations to date, and it provides summary information for site-specific, long-term stewardship scopes, costs, and schedules. The report provides a snapshot of DOE's current understanding of stewardship activities and highlights areas where significant uncertainties still remain.
- *Managing Data for Long-Term Stewardship* (ICF 1998) represents a preliminary assessment of how successfully information about the hazards that remain at DOE sites will be preserved and made accessible for the duration of long-term stewardship.
- *Long-Term Stewardship Study* (DOE 2000a) describes and analyzes several significant national or crosscutting issues associated with long-term stewardship and, where possible, options for addressing these issues. The principal purposes are to promote the exchange of

information and to provide information on the decision-making processes at the national level and at individual sites.

- *The Long-Term Control of Property: Overview of Requirements in Orders DOE 5400.1 and DOE 5400.5* (DOE 1999b) summarizes DOE requirements for radiation protection of the public and environment, with the intent of assisting DOE elements in planning and implementing programs for the long-term control (or, stewardship) of property.
- The Memorandum, “Long-Term Stewardship Guiding Principles” (DOE 2000b) identifies broad concepts pertaining to stewardship and elements that Ohio stakeholders identified as critical to the success of stewardship planning.
- *Institutional Controls in RCRA and CERCLA Response Actions at Department of Energy Facilities* (DOE 2000c) provides DOE environmental restoration project managers with the information on institutional controls that they need to make environmental restoration remedy decisions under the Resource Conservation and Recovery Act (RCRA) and CERCLA.
- *Institutional Controls: A Site Manager’s Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups* (EPA 2000) provides an overview of the types of institutional controls that are commonly available, including their relative strengths and weaknesses. It also provides a discussion of the key factors to consider when evaluating and selecting institutional controls in Superfund and RCRA corrective-action cleanups.

The applicable laws and regulations provide a foundation for legacy management practices, but each site is different. Each facility will have to work in conjunction with those laws and regulations, using them as guidelines, to develop suitable legacy management plans. Part of the legacy management planning at the Fernald Preserve included a study, conducted by Florida International University (FIU), that resulted in the creation of a database of state and federal laws, regulations, orders, and the like that pertain to legacy management. The database includes titles and summaries of the requirements, including a discussion of their applicability to the Fernald Preserve. A summary report describes the project and the development of the database (FIU 2002).

DOE guidance identifies why it was necessary to address legacy management before the completion of remediation and site closure (DOE 1999a):

- To provide a smooth transition from cleanup to legacy management.
- To emphasize that, in many cases, the cleanup goal was to reduce and control, not eliminate, risk and cost.
- To ensure that Congress, the community, and regulators had a clear understanding of the cleanup mission and to clarify that there was an endpoint.
- To set realistic expectations and show interim successes and results as remediation progressed.
- To identify technology research and development needs.
- To assure regulators and the public that DOE would not walk away from its post-remediation obligations.

DOE defines stewardship as “all activities required to protect human health and the environment from hazards remaining after remediation is completed” (DOE 1999a). Three categories, or levels, of stewardship are recognized: “active,” “passive,” and “no stewardship required.” Active stewardship is defined as “the direct performance of continuous or periodic custodial activities such as controlling access to the site; preventing releases from a site; performing maintenance operations; or monitoring performance parameters.” Passive stewardship is defined as “the long-term responsibility to convey information warning about the hazards at a site or limiting access to, or use of, a site through physical or legal mechanisms.” No stewardship is required “where cleanup has been completed to levels that will allow for unrestricted or residential future use” (DOE 1999a). The Fernald Preserve will have a combination of active and passive measures during the legacy management of the site. This plan describes both active and passive measures, ranging from regular monitoring and maintenance to land use restrictions and postings.

The implementation of the DOE-LM Environmental Management System (EMS) will ensure that sound stewardship practices protective of the air, the land, water, and other natural and cultural resources potentially affected by operations are employed throughout the project. EMS is a systematic process for reducing the environmental impacts that result from DOE-LM and contractor work activities, products, and services and for directing work to occur in a manner that protects workers, the public, and the environment. The process adheres to “Plan-Do-Check-Act” principles, mandates environmental compliance, and integrates green initiatives into all phases of work, including scoping, planning, construction, subcontracts, and operations. Proposed site maintenance activities will be assessed for opportunities to improve environmental performance and sustainable environmental practices. Some areas for consideration include reusing and recycling products or wastes, using environmentally preferable products (i.e., products with recycled content, such as office furniture, concrete, asphalt; products with reduced toxicity; and energy-efficient products), using alternative fuels, using renewable energy, and making environmental habitat improvements.

Considering the input of regulators and the public throughout the legacy management process and granting the public access to site information during legacy management are also fundamental components of the long-term care of the Fernald Preserve. Public involvement and access to information during legacy management are emphasized in all DOE policy and guidance, and this Legacy Management Plan is intended to clearly outline DOE’s commitment to those aspects of legacy management.

1.3 Approach to Legacy Management at the Fernald Preserve

At the Fernald Preserve, completing remediation to levels acceptable for unrestricted use was not feasible. As a result, legacy management is necessary to ensure that all remedial efforts continue to be effective and protective of human health and the environment. The OSDF was constructed to contain waste materials that will remain on the Fernald Preserve. This facility must be monitored and maintained to ensure its integrity and the public’s safety.

1.3.1 Inspections per IC Plan Requirements

Site inspections include inspections of the OSDF cap, the leachate collection system (LCS) and the leak detection system (LDS), the CAWWT, extraction wells and associated piping, the active

outfall line, and restored areas of the site. Inspections can be scheduled or unscheduled as needed. These inspections are further defined in the IC Plan.

1.3.2 Increase Monitoring as Needed

DOE-LM has the option of increasing monitoring at any time, as needed. However, any proposed decrease in the frequency of monitoring activities included in the IC Plan will require approval by EPA.

1.3.3 DOE Management of the Legacy Management Program

The mission of the DOE-LM program includes (1) providing sustained human and environmental protection through the mitigation of residual risks and (2) protecting natural and cultural resources at DOE facilities. DOE-LM provides overall departmental policy, direction, and program guidance on matters affecting legacy management.

End of current text

2.0 Site Background

2.1 Site Description

2.1.1 Fernald Preserve Description

The Fernald Preserve is situated on a 1,050-acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The Fernald Preserve is located near the unincorporated communities of Ross, Fernald, Shandon, New Haven, and New Baltimore (Figure 1). The former production area occupies approximately 136 acres in the center of the site. The former waste pit area and the former silos area were located adjacent to the western edge of the production area. Paddys Run flows from north to south along the Fernald Preserve's western boundary and empties into the Great Miami River approximately 1.5 miles south of the site. The Fernald Preserve lies on a terrace that slopes gently between vegetated bedrock outcroppings to the north, southeast, and southwest. The site is situated on a layer of glacial overburden, consisting primarily of clay and silt with minor amounts of sand and gravel, that overlies the Great Miami Aquifer. Paddys Run and the Storm Sewer Outfall Ditch, which empties into Paddys Run, have eroded the glacial overburden, exposing the sand and gravel that make up the Great Miami Aquifer.

2.1.2 Fernald Preserve and Surrounding Area

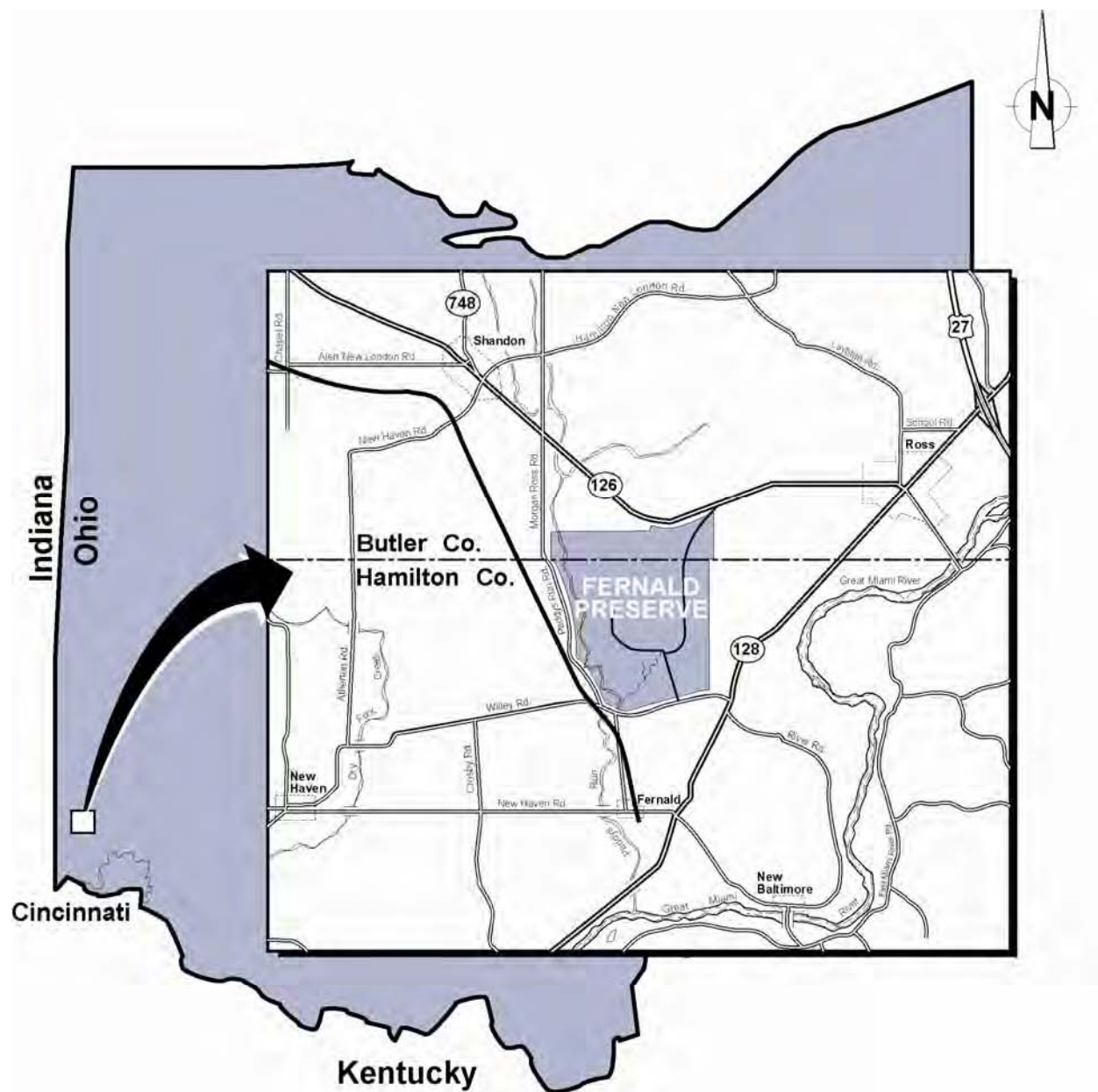
In the vicinity of the Fernald Preserve are the communities of Shandon (northwest), Ross (northeast), New Baltimore (southeast), Fernald (south), and New Haven (southwest) (Figure 1). Land use in the area consists primarily of residential use, farming, and gravel excavation operations. Some land in the vicinity of the Fernald Preserve is dedicated to housing development, light industry, and park land. The Great Miami River is located to the east, and like Paddys Run and the Storm Sewer Outfall Ditch, it has eroded away significant portions of the glacial overburden, exposing the sand and gravel that make up the Great Miami Aquifer.

2.2 Site History

2.2.1 Feed Materials Production Center

The Feed Materials Production Center (FMPC) was the original name given to what is now the Fernald Preserve. The Atomic Energy Commission (AEC) constructed the FMPC in the early 1950s for the purpose of producing high-purity uranium metal from ores and process residues for use at other government facilities involved in the production of nuclear weapons for the nation's defense.

A variety of materials were utilized throughout the production process, including ore concentrates and recycle materials that were dissolved in nitric acid to produce a uranyl nitrate hexahydrate (UNH) feed solution. The UNH was then concentrated and thermally denitrated to uranium trioxide (UO₃), or orange oxide. The orange oxide was either shipped to the gaseous diffusion plant in Paducah, Kentucky, or was converted to uranium tetrafluoride (UF₄), or green salt. The green salt was blended with magnesium-metal granules and placed in a closed reduction pot to produce a mass of uranium metal called a derby. Some derbies were shipped to other facilities, but the remainder were melted and poured into preheated graphite molds to form ingots.



The Fernald site covers about 1,050 acres (425 hectares).

Figure 1. Fernald and Vicinity

Some ingots were rolled or extruded to form billets. Small amounts of thorium were also produced at the site from 1954 to 1975. The site then served as a thorium repository for DOE. Two reports that explain in greater detail the role of the Fernald Preserve within the DOE complex and the processes that took place at the Fernald Preserve are *Historical Documentation of the Fernald Site and Its Role within the U.S. Department of Energy Weapons Complex* (DOE 1998a), and *Historical Documentation of Facilities and Structures at the Fernald Site* (DOE 1998b).

High-purity uranium metal was produced at the site from 1952 through 1989. During that time, more than 500 million pounds of uranium metal products were shipped from Fernald to other sites. During these production operations, uranium was released into the environment, resulting in the contamination of soil, surface water, sediment, and groundwater on and around the site.

2.2.2 Change in Site Mission from Production to Remediation

In July 1986, DOE and EPA signed a Federal Facilities Compliance Agreement (FFCA), addressing impacts to the environment that were associated with the site. DOE agreed to conduct the FFCA investigation as a remedial investigation/feasibility study (RI/FS) in accordance with CERCLA guidelines. In 1989, production ceased at the FMPC due to a decrease in the demand for the feed materials and an increase in environmental restoration efforts. The site was subsequently included on the EPA National Priorities List. In 1991, the site was renamed the Fernald Environmental Management Project, and it was officially closed as a production facility. DOE's management of the site switched from the Defense Programs division to the Environmental Restoration and Waste Management division. The National Lead Company of Ohio operated the site during most of the production years under contracts with AEC and DOE. The Westinghouse Environmental Management Company became the site's prime contractor in 1986. In 1992, after the conversion of the site's mission to environmental cleanup, DOE awarded an Environmental Restoration Management Contract to the Fernald Environmental Restoration Management Corporation, which later became known as Fluor Fernald Inc. DOE awarded a new contract to Fluor Fernald Inc. in November 2000 to complete the facility's remediation. In 2003, DOE changed the site name to the Fernald Closure Project (FCP). The site-wide remediation effort was conducted pursuant to CERCLA. Waste management was conducted according to RCRA.

2.2.3 Current Conditions

The Declaration of Physical Completion occurred on October 29, 2006. All contaminated soils have been excavated and certified to meet final remediation levels (with the exception of certain areas associated with utility corridors and groundwater infrastructure discussed in Section 2.4.4); the OSDF is complete; all required groundwater infrastructure is installed, operational, and secured; and restoration activities have been completed within all excavated areas, including achieving final grade and completing the necessary plantings. The *Certification Report for Area 6 Waste Pits 1, 2, and 3, the Burn Pit, the Clearwell, and the Areas West and North of the Waste Pits* (DOE 2006a) is awaiting agency approval. The areas associated with this certification report will be considered uncertified until the report is approved.

Upon EPA and Ohio Environmental Protection Agency (OEPA) approval, it is anticipated that the LMICP will be finalized by January each year to correspond with calendar-year monitoring and reporting. Comments from EPA, OEPA, and the community will be addressed between October and January.

The future LMICP schedule will be as follows:

- Each June, the annual site environmental reports will be submitted and will include recommendations based on the previous year's monitoring information.
- Each October, an annual review of the LMICP will take place, and updates will be identified as necessary.
- Each January, the revised LMICP will be submitted to correspond with the monitoring and reporting schedule.

Pertinent information associated with the CERCLA 5-year reviews will be included in the LMICP revisions as needed.

2.3 Remediation Process

2.3.1 Summary of Remediation Efforts

CERCLA is the primary driver for the environmental remediation of the Fernald Preserve. The site was divided into five operable units (OUs) as follows:

- OU1—Waste Pits Area
- OU2—Other Waste Units
- OU3—Production Area
- OU4—Silos 1 through 4
- OU5—Environmental Media

An RI/FS was conducted for each of the five OUs listed above. Based on the results of the RI/FS, RODs outlining the selected remedy for each OU were issued. A summary of the remedies follows.

The remedy for OU1 included removing all material from the waste pits, stabilizing the material by drying it, and shipping it off site for disposal. This process was completed in summer 2005.

The remedy for OU2 included removing material from the various units, disposing of material that met the on-site waste acceptance criteria (WAC) in the OSDF, and shipping all other material off site for disposal. DOE and regulators, in consultation with the community, developed the WAC to strictly control the type of waste disposed of on site.

The OU3 remedy included decontaminating and decommissioning all contaminated structures and buildings, recycling waste materials if possible, disposing of material that met the on-site WAC in the OSDF, and shipping all other material off site for disposal.

The OU4 remedy included removing and treating all material from the silos, dismantling the silos, and shipping the waste materials and silo debris off site for disposal.

OU5 includes all environmental media, such as soil, sediment, surface water, groundwater, and vegetation. *The Site-wide Excavation Plan* (SEP) (DOE 1998d) describes the remediation of soils. First, material exceeding the WAC for the OSDF was disposed of by one of the following

methods: (1) transporting material to an off-site disposal facility for treatment and disposal, (2) treating material on site and transporting it to an off-site disposal facility, or (3) treating material on site and disposing of it in the OSDF. Details and exceptions for the methods listed above are outlined in the SEP.

Soils and sediments that exceeded final remediation levels (FRLs), which are defined in the SEP, but were below the OSDF WAC were excavated and placed in the OSDF. Soil certification processes were performed to ensure that excavation has removed all impacted material, as outlined in the SEP. Several sub-grade utility corridors that are being used to support the continuing groundwater remediation were not certified at closure, but they will be certified following the completion of remediation and their discontinued use (see Section 2.4.4).

The OU5 ROD (DOE 1996c) describes the approved remediation method of pump-and-treat for groundwater. The OU5 ROD (DOE 1996c) also committed to continual evaluation of remediation technologies to allow for the improvement of the remedy with new technologies. As a result, an enhanced groundwater remedy, which could reduce groundwater remediation by 10 years, was suggested and subsequently approved. The enhanced remedy includes additional extraction wells.

The primary constituent of concern for groundwater is uranium. Other constituents have been identified and will be removed during the remediation of the uranium. A complete list of all of the constituents identified in groundwater can be found in the OU5 ROD (DOE 1996c). The FRL for uranium in groundwater is 30 parts per billion (ppb). In the original ROD, the FRL for uranium in groundwater was 20 ppb. After EPA changed the drinking water standard, and after EPA and OEPA approved of the *Explanation of Significant Differences for Operable Unit 5* (DOE 2001c), the FRL was raised to 30 ppb. DOE and regulators based the target cleanup levels for groundwater on the use of the aquifer as a potable water supply and incorporated Safe Drinking Water Act standards for all constituents for which these standards were available.

Ecological restoration followed remediation and was the final step in completing the site's cleanup. The goal for ecological restoration of the Fernald Preserve was to enhance, restore, and construct (as feasible, given post-excavation landforms and soils) the early stages of vegetative communities native to pre-settlement southwestern Ohio. Figure 2 illustrates the ecological restoration of the Fernald Preserve. The restoration of the Fernald Preserve involved four major components:

- Expanding and enhancing the riparian corridor along Paddys Run.
- Expanding and enhancing the wooded areas in the northern portion of the Fernald Preserve.
- Restoring a contiguous prairie in the central and eastern portions of the Fernald Preserve (including the OSDF).
- Creating open water areas and wetlands throughout the site as topography and hydrology allow.

2.3.2 Completion of Site Remediation

In January 2003, the site's name was changed to the FCP. DOE's closure contract with Fluor Fernald Inc. outlined the scope of remediation activities required for closure. The process of legacy management or long-term stewardship began immediately following DOE's Determination of

Reasonableness, or acceptance, of Fluor Fernald Inc.'s Declaration of Physical Completion (the point commonly referred to as "closure"). The Declaration of Physical Completion occurred on the day that remediation of the site (with the exception of groundwater) as outlined in Fluor Fernald Inc.'s Comprehensive Exit Transition Plan was completed. DOE-LM assumed legacy management responsibilities for the site on that date.

2.4 Site Conditions at Closure

What follows is an overview of the site conditions after remediation. It is clear that some remediation (i.e., continuing groundwater remediation) will be ongoing during legacy management.

2.4.1 OSDF

Based on a pre-design investigation, the most suitable location for the OSDF was determined to be on the eastern side of the Fernald Preserve (Figure 2). The details of the investigation are in the *Pre-design Investigation and Site Selection Report for the On-site Disposal Facility* (DOE 1995b). This location was considered the best because of the thickness of the gray clay layer that overlies the Great Miami Aquifer.

Construction on Cell 1 of the OSDF was initiated in December 1997, and the permanent cap for Cell 1 was complete in late 2001. The OSDF consists of eight individual cells covered by a continuous permanent cap. The final dimensions are approximately 950 feet (ft) east to west and 3,600 ft north to south, with a maximum height of 65 ft. It was anticipated that 2.5 million cubic yards of impacted materials would be placed in the facility. Approximately 80 percent of the material would be impacted soil, and the remaining 20 percent would consist of building demolition rubble, fly ash, lime sludge, and small amounts of miscellaneous materials. The PCCIP (Attachment B) provides a summary of the materials permitted to be placed in the OSDF. The volumes and percentages mentioned above were subject to change during the actual remediation process. Final volumes are included with the as-built drawings.

The design approach for the OSDF can be found in both the OU2 ROD (DOE 1995c) and the *Final Design Calculation Package; On-site Disposal Facility* (GeoSyntec 1997). The design includes a liner system, impacted-material placement, a final cover system, a leachate management system, a surface water management system, and other ancillary features.

The footprint of the actual disposal facility is approximately 75 acres. A buffer area and perimeter fence surrounds the disposal facility. The OSDF, including the buffer, covers approximately 120 acres. Institutional controls are described in further detail in the IC Plan (Volume II) with additional details included in the PCCIP (Attachment B), OU2 ROD (DOE 1995c), and OU5 ROD (DOE 1996c).

2.4.2 Restored Areas

Approximately 900 acres of the Fernald Preserve were ecologically restored. Restored areas are those parts of the site that have been graded following remedial excavation, amended, planted, or enhanced to create the early stages of ecosystems comparable to native pre-settlement southwestern Ohio. The specific habitats restored include upland forest; riparian forest; tallgrass

FERNALD LEGACY MANAGEMENT

Future Use

LAND USE

395 acres of Woodlots
332 acres of Prairie
120 acres of OSDF
81 acres of Wetlands
60 acres of Open Water
33 acres of Savanna
29 acres of Infrastructure



Figure 2



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prairie and savanna; and wetlands and open water (Figure 2). In addition, previously existing habitats (such as the pine plantations) were enhanced.

What follows are brief summaries of the habitat restorations. Details of the actual projects and further information on the restored areas are described in the *Natural Resources Restoration Plan* (DOE 2002).

Upland Forest: Upland forest areas existed in a northern portion, in a southern portion, and on the western perimeter of the site. Restoration activities were conducted to expand these forested areas. The *Site-wide Characterization Report* (DOE 1993) describes the Fernald Preserve as existing in a transition zone between the Oak–Hickory and Beech–Maple sections of the Eastern Deciduous Forest province. That is, a mosaic of both Oak–Hickory and Beech–Maple forest types can be found in southwestern Ohio. Forest communities at the Fernald Preserve would gradually move toward one of these forest types, depending on site-specific factors such as topography and hydrology. Therefore, the restoration of upland forests at the Fernald Preserve focused on the establishment of this Beech–Maple/Oak–Hickory transition zone. The trees used are native to southwestern Ohio and are listed in the NRRP, Table 3-1.

Riparian Forest: Riparian corridors existed along Paddys Run and the Storm Sewer Outfall Ditch. Restoration activities were conducted to expand these corridors through revegetation. The selected species of trees were those that can withstand periodic inundation, and they are listed in the NRRP. The Paddys Run floodplain was expanded as part of the long-term management plan for Paddys Run.

Tallgrass Prairie and Savanna: The waste pit, production, OSDF, and borrow (east field) areas were restored as a contiguous prairie. Some prairies and savannas were established along the western perimeter of the site, but the concentration was primarily in formerly disturbed areas. Prairie restoration involved amending soil, if necessary, and seeding grasses and forbs (wildflowers). All seeded grasses and forbs were native to the area. Savannas were established by planting a sparse mix of trees and shrubs, and seeding the area with native grasses.

While not considered a part of the restored prairies on site, the OSDF, located adjacent to both the former production area and the borrow area, is also being seeded with native prairie grasses to provide vegetative cover. The native grasses are being used because of their ecological benefits, drought tolerance, and ability to provide soil stability.

Wetlands and Open Water: Wetlands and open water areas were established throughout the site where topography permitted. The former production area has open water areas as a result of deep excavations, and wetlands will be established throughout the site. DOE is responsible for providing 17.8 acres of mitigated wetlands under Section 404 of the Clean Water Act. In addition to mitigating wetlands, upland and riparian forest revegetation in various areas was designed to restore wet woods. Details and drivers for wetland mitigation are described in the NRRP.

2.4.3 Groundwater

Groundwater remediation and monitoring will continue until the FRL of 30 ppb for uranium has been achieved. Groundwater monitoring will be required following the completion of remediation to ensure continued protectiveness of the remedy and to support the CERCLA 5-year reviews. The OMMP is included as Attachment A to the LMICP and describes the groundwater extraction

system (well fields, treatment facility, etc.) used to complete the remedy. Additional information is included in Section 3.1.3 of the IC Plan. Long-term monitoring of groundwater will be required around the OSDF. The exact approach to groundwater monitoring has been continuously refined, with input from the community and regulators.

2.4.4 Uncertified Areas

There are two facilities on site where the soils have yet to be certified: the CAWWT and the South Field Valve House (Figure 3). There are also sub-grade utility corridors that were not certified at closure (Figure 4). These facilities and utilities primarily support the ongoing groundwater remedy and are located below certified areas.

The 60-inch Main Drainage Corridor culvert and an adjacent 18-inch culvert were left in place even though there is fixed contamination within the culverts. Both culverts are located directly below the OSDF leachate conveyance system and the main effluent line running between the CAWWT and the Great Miami River. Due to their location, these culverts could not have been removed without potentially impacting ongoing CAWWT and OSDF operations. The 18-inch culvert is completely buried, and grating was installed on the ends of the 60-inch culvert to prevent access.

The certification of the sub-grade utility corridors will occur following the completion of groundwater remediation, when these systems are no longer needed and are removed. Certification of the soils within the footprints of the CAWWT and South Field Valve House will occur when these facilities are no longer needed, are removed from service, and are decommissioned and dismantled. Due to the uncertainty of the groundwater remediation end date, no firm schedule for soil certification in the corridors can be established at this time.

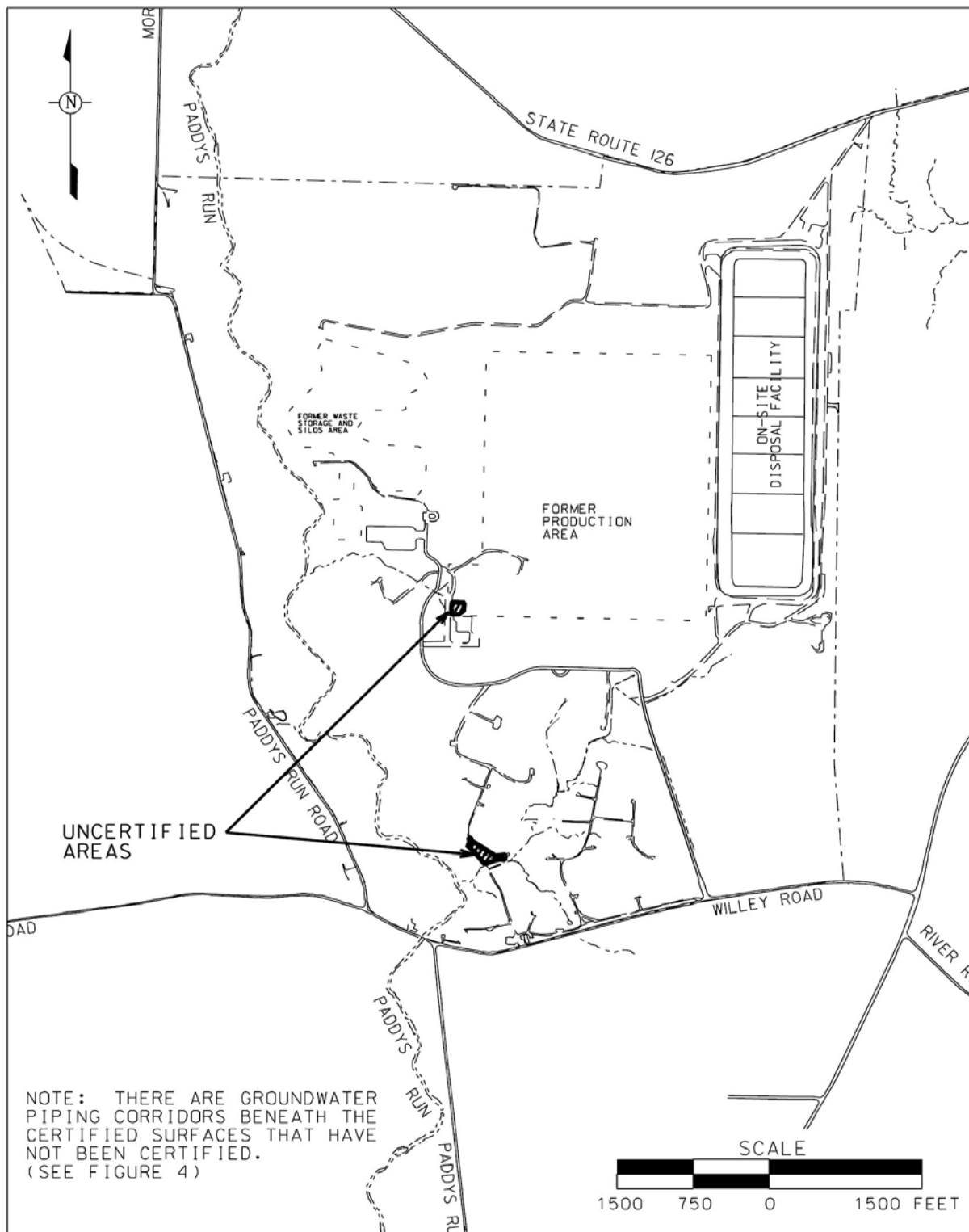
In the case of the existing paved roads, the roadways themselves cannot be certified; however, the soil beneath them is certified.

2.4.5 Existing Infrastructure and Facilities

A few facilities remain on site. These include the CAWWT and supporting infrastructure, extraction wells and associated piping and utilities, the outfall line to the Great Miami River, the restoration storage shed, the former Communications Building, and the former Silos Warehouse.

DOE is in the process of establishing a Visitors Center on site; the center is expected to be completed in June 2008. The former Silos Warehouse is being refurbished for use as the Visitors Center. The center will contain information and context on the remediation of the Fernald Preserve, including information on site restrictions, ongoing maintenance and monitoring, and residual risk. It will also provide historical information and photographs, a meeting place, and other educational resources as appropriate. A primary goal of the Visitors Center is to fulfill an informational and educational function within the surrounding community. The information made available at the center serves as an institutional control. The center will serve to maintain awareness of site history and conditions and help prevent unsafe disturbances and uses of the site.

The Visitors Center will be maintained and operated under the direction of DOE-LM. On a periodic basis, DOE will evaluate the use of the Visitors Center, and the programming provided there, with community input. Upon the Visitors Center's completion, DOE will obtain community input on decisions regarding changes to and the ongoing operation of the center.



FINAL

Figure 3. Uncertified Areas

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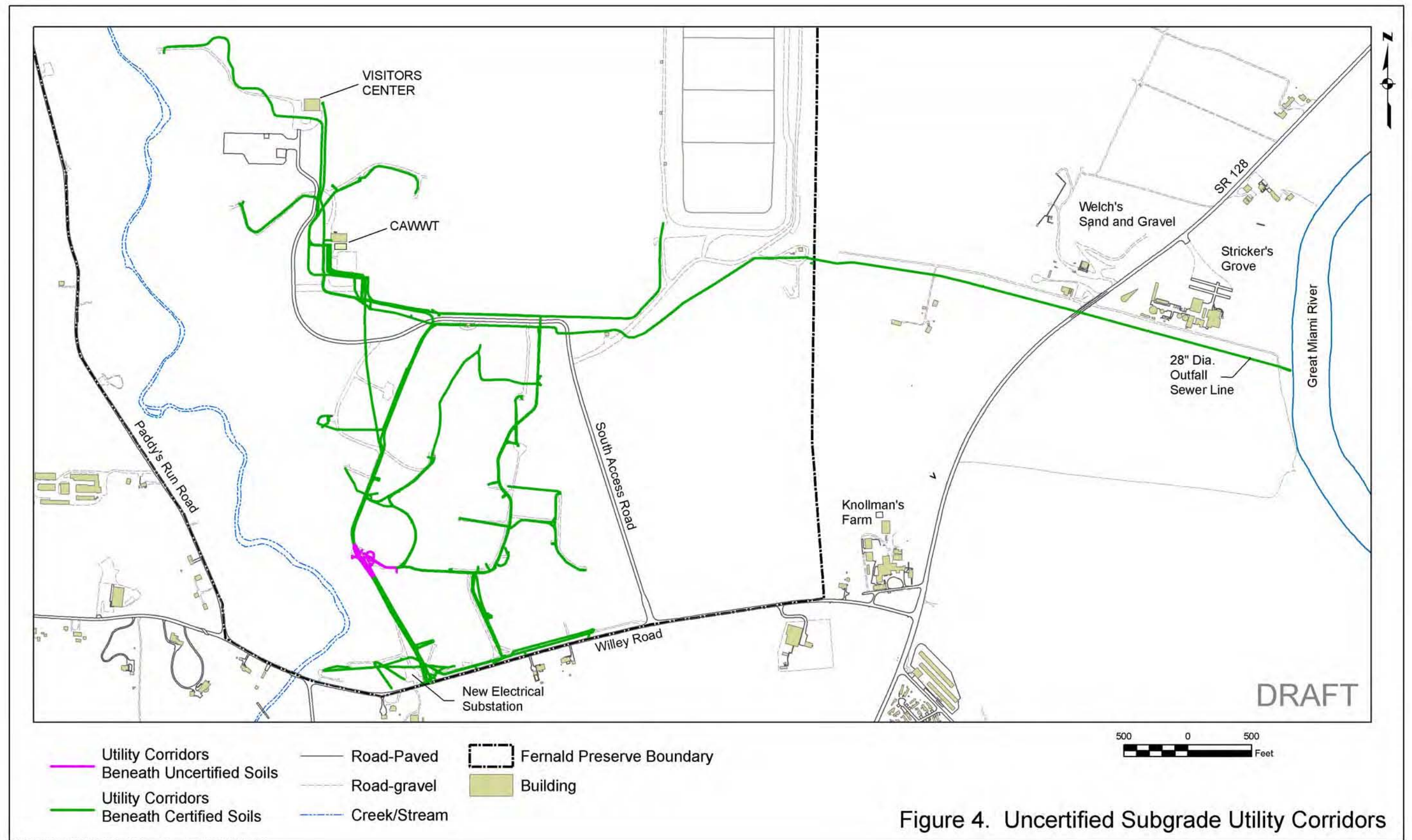


Figure 4. Uncertified Subgrade Utility Corridors

Figure 4. Uncertified Subgrade Utility Corridors

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3.0 Scope of Legacy Management at the Fernald Preserve

Post-closure requirements include maintaining the remedies and ensuring the protectiveness of human health and the environment. Other post-closure activities include monitoring and maintaining the Fernald Preserve property, facilities, and structures that remain. Post-closure requirements at the Fernald Preserve are the responsibility of DOE-LM. Within DOE-LM, the Office of Site Operations (LM-20) is responsible for ongoing surveillance and maintenance at the Fernald Preserve and the continuation of the groundwater remedy.

The commitments in the RODs relevant to legacy management include the following:

- DOE will achieve the FRLs for all contamination attributed to the Fernald Preserve. Site-wide cleanup levels for soil are documented in the OU2 ROD (DOE 1995c) and in the OU5 ROD (DOE 1996c) based on a recreational-use and undeveloped-park (i.e., greenspace) scenario. The FRLs do not allow unrestricted use of the Fernald Preserve, and institutional controls are required.
- Per the OU2 ROD (DOE 1995c), the Fernald Preserve will remain under federal ownership. Therefore, any final land-use alternative and legacy management planning must include DOE's commitment to continued federal ownership.
- Commitments for other environmental monitoring will be carried out as long as appropriate per the existing RODs.

Maintaining institutional controls at the Fernald Preserve is a fundamental component of legacy management and includes ensuring that no residential or agricultural uses and only limited recreational uses occur on the property. Activities such as swimming, hunting, fishing, and camping are prohibited. Additional information regarding prohibited activities is included in the IC Plan, Section 2.1. The intent of this Legacy Management Plan is to provide an overview of institutional controls required for the Fernald Preserve to support legacy management. The separate IC Plan is required for the Fernald Preserve per the DOE's commitment to EPA in the OU5 ROD (DOE 1996c). The IC Plan is included as Volume II of this LMICP. DOE and EPA guidance were used to identify planned institutional controls at the Fernald Preserve. The IC Plan will continue to be updated annually, as necessary, based on changing site conditions and input from the community and regulators. Section 4.4 discusses the 5-year review process and how it relates to legacy management, including institutional controls.

The scope of legacy management activities at the Fernald Preserve can be divided into three categories: (1) the operation and maintenance of the remedies, (2) surveillance and maintenance in restored areas, and (3) public involvement. Legacy management activities related to the maintenance of the remedies include monitoring and maintaining the OSDF, the CAWWT and supporting infrastructure, the extraction wells and associated piping, and the active outfall line to the Great Miami River. Also included is the decontamination and dismantling of the aquifer remediation infrastructure (CAWWT, well system, etc.). The OMMP includes the details of the monitoring and maintenance of the CAWWT, groundwater restoration systems, and the active outfall line. Legacy management activities also include ensuring that remedy-driven restrictions on access to and use of the Fernald Preserve are enforced, that aquifer remediation is continued, and that information is properly managed.

Legacy management in restored areas includes ensuring that natural and cultural resources are protected in accordance with applicable laws and regulations. Any amenities supporting access to and use of the Fernald Preserve will be kept in a safe configuration. The cleanup levels established for the Fernald Preserve ensured that the site was remediated to a level consistent with recreational use.

The potential reburial of Native American remains is another initiative that has been considered at the Fernald Preserve since 1999. DOE agreed to make land available for the reinterment of Native American remains with the following understandings:

- The land remains under federal ownership.
- DOE will not take responsibility for, or manage, the reinterment process. DOE will neither fund nor implement maintenance and monitoring.
- The remains must be culturally affiliated with a modern-day tribe. The National Park Service had no objections to the reinterment process as long as the “repatriations associated with the reburials comply with the Native American Graves Protection and Repatriation Act as applicable.”
- Records must be maintained for all repatriated items reinterred under this process. DOE is not responsible for these records.

Thus far, several federally recognized tribes have been contacted regarding this offer of land for reinterment purposes. To date, DOE has received only one response from a modern-day tribe with repatriated remains under the Native American Graves Protection and Repatriation Act. The Miami Tribe of Oklahoma has informed DOE that they are not interested in using the site. No other responses from modern-day tribes have been received, and DOE is no longer pursuing the effort. The proposal may be reconsidered in the future if other modern-day tribes with repatriated remains come forward.

Legacy management activities related to public involvement include ongoing communication with the public regarding continuing groundwater remediation, legacy management activities, and the future of the Fernald Preserve. Emphasis will also be placed on educating the public about the site’s former production activities, its remediation, and its land use restrictions. Displays and programs at the Visitors Center and outreach programs at local schools and organizations will help DOE-LM meet this objective.

3.1 Legacy Management of the OSDF

The OU2 ROD (DOE 1995c) states that the Fernald Preserve will remain under federal ownership. DOE has committed to the goal of ensuring legacy management activities of the OSDF in perpetuity. The PCCIP (Attachment B) for the OSDF outlines the routine legacy management activities for the initial 30 years. The activities include routine inspections and ongoing monitoring of the LCS, the LDS, and groundwater in the vicinity of the OSDF. DOE will conduct CERCLA reviews every 5 years and will issue a report summarizing the results of the review to the appropriate regulatory agencies. Periodic monitoring and maintenance of the LCS and the vegetative cap of the OSDF will be necessary, as will the occasional maintenance of signs, fencing, and the buffer zone around the OSDF. The inspections and monitoring are discussed in greater detail in the IC Plan.

The extent of legacy management activities will continue to be defined based on regulatory requirements, community and regulatory input, and agreements between DOE, EPA, and OEPA. More information about the maintenance and monitoring requirements for the LCS, the capping and cover system, and the support systems for the OSDF are included in the IC Plan and supporting documents.

3.2 Surveillance and Maintenance of Restored Areas

Per the OU5 ROD (DOE 1996c), DOE will protect the existing natural resources at the Fernald Preserve. The monitoring and maintenance of restored areas focus on ensuring that natural resources are protected in accordance with appropriate laws and regulations, such as the Clean Water Act and the Endangered Species Act. Wetlands and threatened and endangered species are examples of natural resources that will be monitored. Existing cultural resource areas will also have to be monitored to ensure that their integrity is not threatened.

Restored areas will be inspected to ensure that protected natural resources are maintained in accordance with applicable laws and regulations. The physical disturbance of restored areas will not be permitted unless it is authorized by DOE-LM (if necessary, in consultation with EPA). Soil and vegetation will not be removed from the Fernald Preserve unless DOE-LM authorizes their removal.

Existing cultural resource areas, including the reinterment area that resulted from the public water supply project, is a part of the undeveloped park and requires inspections to ensure their preservation and to determine if natural forces, vandalism, or looting are affecting the resources. Actions will be implemented if there is evidence that the integrity of a site is threatened due to natural or human forces.

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4.0 Oversight of Legacy Management at the Fernald Preserve

4.1 Office of Legacy Management Responsibilities

DOE-LM is responsible for the oversight of the Fernald Preserve during legacy management. They will ensure that all legacy management activities are conducted as required. They are the decision-making body regarding changes in surveillance, maintenance, engineering, access, public use, and the like. DOE-LM also manages any contractors hired to perform work required for legacy management purposes and ensures that the contractors have the skills necessary to perform the work. Additionally, DOE-LM is responsible for communicating with regulators and the public regarding the legacy management of the Fernald Preserve.

4.2 Role of the Site Contractor and Use of Subcontracts

A site contractor, or contractors, will support DOE-LM, will work closely with and communicate regularly with DOE-LM, and will be the physical presence at the site. Contractor personnel will be responsible for operating the groundwater remediation systems, conducting inspections, monitoring, and sampling. They will collect all data, develop the reports, and make those reports available to the community and the public. Maintenance activities for the OSDF will be their responsibility as well. The contractors will notify DOE-LM in the event of an emergency and will take action to prevent damage to the site.

Operation and maintenance tasks may be carried out by additional subcontractor services. Examples include minor repairs to fencing, gates, signs, or components of the groundwater infrastructure. Repairs that require earthwork, erosion control, seeding, mowing, clearing, herbicide application, or repair to pumps and piping will be completed by subcontractor services.

Goods and services will be procured according to DOE-approved procurement policies and procedures. These procedures use the best commercial practices and are in compliance with the requirements and intent of the federal acquisition regulations and DOE acquisition regulations. The terms and conditions in subcontracts incorporate the required flow-down clauses from the prime contract.

As requirements are identified by technical leads, a scope of work will be developed, and a solicitation package will be initiated. The package will generally include statements of work, health and safety requirements, estimated costs, and required approvals. The written contracts will also include the appropriate restrictions and prohibited activities for the work to be performed on site. In cases where there are similar existing subcontracts, the existing work scope may be used as a framework for a new subcontract. New subcontracts may be developed through a competitive bid process or through the negotiation of a sole-source procurement. The type of procurement will be determined by analyzing the unique nature of the work scope, the critical nature of the services, and the importance of historical information known only by the previous contractor. Although DOE-LM intends to maximize the use of new subcontracts for most services, there may be a need to request the assignment of an existing subcontract in unique circumstances to ensure continuation of a service.

4.3 Role of Regulators

DOE-LM is required to implement the requirements outlined in the IC Plan subject to enforcement by EPA. The regulators will ensure that DOE is performing the required legacy management operations, surveillance, and maintenance activities at the Fernald Preserve, as agreed upon by the DOE and EPA, in consultation with the OEPA, in the LMICP. Both EPA and OEPA will be provided with all reporting on the legacy management activities at the Fernald Preserve. Both EPA and OEPA will be notified of any institutional control breaches as outlined in Section 4.0 of the IC Plan. Both EPA and OEPA will be involved in overseeing the legacy management activities at the Fernald Preserve.

4.4 CERCLA 5-Year Reviews

Under CERCLA, if use of a site is limited because a certain level of contamination remains there, then a review of the remedy at that site is required every 5 years. The CERCLA 5-year reviews at the Fernald Preserve will focus on the protectiveness of the remedies associated with each of the five OUs. Summaries of the inspections conducted for the OSDF, the CAWWT facility, the groundwater restoration system, and the active outfall line to the Great Miami River will also be included. To facilitate the review, a report addressing the ongoing protectiveness of the remedies will be prepared and will be submitted to EPA and OEPA. The institutional controls portion of the report will include the data collected from monitoring and sampling; summaries of inspections of the Fernald Preserve, the OSDF site, and the OSDF cap conducted during the 5-year period; and a discussion of the effectiveness of the institutional controls. If it is determined that a particular control is not meeting its objectives, then required corrective actions will be included. The review may lead to revisions to the monitoring and reporting protocols. The last CERCLA 5-year review was completed in August 2006. Therefore, the next review is due in 2011.

4.5 Reporting Requirements

The annual site environmental report will continue to be submitted to EPA, OEPA, and distributed to key stakeholders on June 1 of each year. It will provide information on institutional controls, monitoring, maintenance, site inspections, and corrective actions while continuing to document the technical approach and summarizing the data for each environmental medium, along with summarizing CERCLA, RCRA, and waste management activities. The report will also include water quality and water accumulation rate data from the OSDF monitoring program. The summary report serves the needs of both the regulatory agencies and other key stakeholders. The detailed appendixes accompanying the site environmental report are intended for a more technical audience, including the regulatory agencies, and will serve to fulfill National Emissions Standards for Hazardous Air Pollutants reporting requirements, as necessary. Additionally, there will be continued reporting requirements as required under other regulatory programs, which will be addressed outside the annual site environmental reports (e.g., National Pollutant Discharge Elimination System monthly discharge reports).

5.0 Records Management

The long-term retention of records and dissemination of information is another critical aspect of legacy management. DOE-LM will manage records that are needed for legacy management purposes. Records will be dispositioned in accordance with DOE requirements at the National Archives and Records Administration (NARA) or a federal records center for their required retention period. Records that have reached the scheduled retention period will be reviewed and approved by management for final destruction or rescheduled for additional retention. For legacy management purposes, DOE-LM will retain copies of selected records documenting past remedial activities (e.g., CERCLA Administrative Record [AR]) in the public reading room located at the Delta Building, 10995 Hamilton-Cleves Highway, Harrison, Ohio 45030. Additionally, the CERCLA AR and frequently requested documents are available to stakeholders at <http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm>.

Stewards and stakeholders, whether located in the surrounding community or in remote locations, will require easy access to copies of the CERCLA AR. The Visitors Center, which is anticipated to be open to the public in June 2008, will house computing facilities for acquisition and access. Fernald environmental data are available to the public through DOE-LM's Geospatial Environmental Mapping System at <http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm>. The system to support legacy management addresses the following:

- On-site data transmission, telecommunications, and computing-resource requirements.
- Data acquisition standards and protocols for newly collected data and for historical data and images to be transferred to the repository.
- Analysis tools, integration with other data sources, and notification services to assist remotely located users.
- Electronic data storage requirements.
- Data management and validation practices sufficient to ensure defensible information.
- Plans for periodic storage infrastructure reviews and upgrades to ensure that electronic information is continually available as technology advances.
- Integration with any DOE or federally mandated central repository for electronic records or data, as appropriate.
- Web-based retrieval, search, and reporting capabilities.

Examples of electronic data include environmental sampling and monitoring data, OSDF monitoring data, and soil certification data as well as electronic images, design drawings, and electronic records. This information is required for the purposes of generating required reports, including the CERCLA 5-year review, for the efficient management of the data collection process, and for public use.

Within 60 days of EPA's approval of this LMICP, the Fernald LM website will be updated to include the most recent version of the LMICP.

5.1 Types of Data Required for Legacy Management

Data determined critical for legacy management purposes have been divided into four categories: historical data, RI/FS process and results, remediation data, and post-site closure data. Table 5–1 presents the types of information that fall into each category.

Based on the four categories, DOE personnel, working with stakeholders, identified records considered critical for legacy management. Interface with stakeholder groups was initiated in the fall of 2002 to ensure that the appropriate types of information and records were being retained to support legacy management. The ongoing interface with stakeholders will allow DOE to retain the appropriate information to support future legacy management needs.

5.2 Legacy Management Records Custodian

DOE-LM assumed custodianship of the Fernald records when the site was transitioned to Legacy Management. Site records fall under the DOE retention schedules and will remain in DOE custody for the required, pre-established retention period.

5.3 Records Storage Location

Fernald records are currently stored at two locations: the National Archives, Great Lakes Region, in Dayton, Ohio, and the National Archives, Great Lakes Region, in Chicago. Their respective websites are <http://www.archives.gov/great-lakes/dayton/> and <http://www.archives.gov/great-lakes/chicago/>. Fernald records will be transferred to a facility located in Morgantown, West Virginia, when construction is completed; additional information regarding the Morgantown facility will be available then. The facility's completion is scheduled for fall 2009.

5.4 Public Access Requirements

The CERCLA AR documents for the Fernald Preserve were scanned into industry-standard searchable Adobe Acrobat portable document file (PDF) format for viewing over the Internet. Document meta-data is stored in a FileMaker Pro database. The database also contains pointers to the PDF images of the documents. These files are available on the Fernald Preserve LM website (<http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm>).

Features of the public-access website include a search engine that allows users to search by document number, document date, document title, and description. Additionally, users can search for text contained within the document. Search results can be sorted by document number, document date, or document title. Document content is displayed using the Adobe Acrobat Reader software. The CERCLA AR will be updated as new documents are created.

Table 5–1. Types of Data Needed to Support Legacy Management Activities

Data Category	Summary of Information Required
Historical Data	<ul style="list-style-type: none"> • Real estate records • Information pertaining to the acquisition of property • Process documents/reports (summary level) • Cultural-resource records • Photographs (significant for legacy management purposes)
RI/FS Process and Results	<ul style="list-style-type: none"> • Risk assessments • Public comments • RI/FS reports for each OU • RODs for each OU • ROD amendment documents
Remediation Data	<p>For soil:</p> <ul style="list-style-type: none"> • Design and excavation plans • Documentation of the certification process for each area/phase • Certification reports* <p>For groundwater:</p> <ul style="list-style-type: none"> • Pump-and-treat system design documents • Groundwater monitoring data • Groundwater extraction data • Design and monitoring data for the CAWWT <p>For Environmental Monitoring:</p> <ul style="list-style-type: none"> • IEMP reports* • Regular updates* <p>For buildings and structures:</p> <ul style="list-style-type: none"> • Plans for decommissioning and dismantling buildings and structures <p>For OSDF:</p> <ul style="list-style-type: none"> • Design, construction, material placement and closure documentation • Leak detection/leachate monitoring data • Cover/cap monitoring data <p>For Restoration:</p> <ul style="list-style-type: none"> • Design plans • Implementation documentation • Completion reports • Monitoring data* <p>General:</p> <ul style="list-style-type: none"> • RD/RA Reports • Aerial photographs taken during remediation processes
Post-Closure Data	<ul style="list-style-type: none"> • Decision documents on land use • Documents on public-use decisions • All monitoring and maintenance data for the OSDF • All monitoring and maintenance data for the restored areas* • All institutional control data • Drawings of remaining facilities (including the OSDF)

*Will require retention of electronic data.

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6.0 Funding

DOE will need to secure funding for legacy management in future budget requests for the years after site closure. Currently, it is anticipated that Office of Legacy Management funds will be available for monitoring and maintaining the OSDF, managing leachate, remediating the aquifer, and ensuring that applicable laws and regulations are adhered to in restored areas. DOE will keep the public informed of its plans to fund legacy management activities as new information becomes available.

Currently, legacy management activities at the various DOE facilities are funded through the annual appropriations process. Funding for sites in the long-term surveillance and maintenance program is maintained in a separate line item in the DOE-LM budget. For the time being, this process for funding legacy management will continue; however, DOE will continue to investigate other funding and management options.

End of current text

7.0 References

DOE (U.S. Department of Energy), 1992a. *Site Development Planning*, DOE Order 4320.1B, Chg. 1, Washington, DC, June.

DOE (U.S. Department of Energy), 1992b. *American Indian Tribal Government Policy*, DOE Order 1230.2, Washington, DC, April.

DOE (U.S. Department of Energy), 1993. *Site-wide Characterization Report*, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, May.

DOE (U.S. Department of Energy), 1994. *Memorandum: The Secretary of Energy's Land and Facility Use Policy*, December 21.

DOE (U.S. Department of Energy), 1995a. *Life Cycle Asset Management*, DOE Order 430.1, Washington, DC, August.

DOE (U.S. Department of Energy), 1995b. *Pre-design Investigation and Site Selection Report for the On-site Disposal Facility*, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, July.

DOE (U.S. Department of Energy), 1995c. *Final Record of Decision for Remedial Actions at Operable Unit 2*, 7021 U-004-501.3, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, May.

DOE (U.S. Department of Energy), 1996a. *Information Management Program*, DOE Order 200.1, Washington, DC, September.

DOE (U.S. Department of Energy), 1996b. *Land and Facility Use Planning*, DOE Policy 430.1, Washington, DC, July.

DOE (U.S. Department of Energy), 1996c. *Final Record of Decision for Remedial Actions at Operable Unit 5*, 7478 U-007-501.4, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, January.

DOE (U.S. Department of Energy), 1998a. *Historical Documentation of the Fernald Preserve and Its Role within the U.S. Department of Energy's Weapon Complex*, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

DOE (U.S. Department of Energy), 1998b. *Historical Documentation of Facilities and Structures at the Fernald Preserve*, 20900-RP-0002, Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, January.

DOE (U.S. Department of Energy), 1998c. *Environmental Assessment for Proposed Final Land Use at the Fernald Environmental Management Project*, Revision 1, DOE, Fernald Area Office, Cincinnati, Ohio, July.

DOE (U.S. Department of Energy), 1998d. *Site-wide Excavation Plan*, 2500-WP-0028, Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, July.

DOE (U.S. Department of Energy), 1999a. *From Cleanup to Stewardship—A Companion to “Accelerating Cleanup: Path to Closure and Background Information to Support the Scoping Process Required for the 1998 PEIS Settlement Study,”* DOE, Office of Environmental Management, October.

DOE (U.S. Department of Energy), 1999b. *The Long-Term Control of Property: Overview of Requirements in Orders DOE 5400.1 and DOE 5400.5*, Information Brief, EH-412-0014/1099, DOE, Office of Environmental Policy and Guidance, October.

DOE (U.S. Department of Energy), 2000a. *Long-Term Stewardship Study*, Volumes 1 and 2, Final Study, DOE, Office of Environmental Management, Office of Long-Term Stewardship, October.

DOE (U.S. Department of Energy), 2000b. *Memorandum: Long-Term Stewardship “Guiding Principles,”* DOE, Ohio Field Office, Miamisburg, Ohio.

DOE (U.S. Department of Energy), 2000c. *Institutional Controls in RCRA and CERCLA Response Actions at Department of Energy Facilities*, DOE/EH-413-0004, DOE, Office of Environmental Policy and Guidance, August.

DOE (U.S. Department of Energy), 2001a. *Radioactive Waste Management*, DOE Order 435.1, Chg. 1, Washington, DC, August.

DOE (U.S. Department of Energy), 2001b. *A Report to Congress on Long-Term Stewardship*, Volumes 1 and 2, R-01-025, DOE Office of Environmental Management, Office of Long-Term Stewardship, January.

DOE (U.S. Department of Energy), 2001c. *Explanation of Significant Differences for Operable Unit 5*, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, October.

DOE (U.S. Department of Energy), 2002. *Natural Resources Restoration Plan*, Final Draft, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

DOE (U.S. Department of Energy), 2003. *Radiation Protection of the Public and the Environment*, DOE Order 5400.5, Chg. 2, Washington, DC, January.

DOE (U.S. Department of Energy), 2005a. *Use of Institutional Controls*, DOE Policy 454.1, Washington, DC, October.

DOE (U.S. Department of Energy), 2005b. *Environmental Protection Program*, DOE Order 450.1, Chg. 2, Washington, DC, December.

DOE (U.S. Department of Energy), 2006a. *Certification Report for Area 6 Waste Pits 1, 2, and 3, the Burn Pit, the Clearwell, and the Areas West and North of the Waste Pits*, February.

EPA (U.S. Environmental Protection Agency), 2000. *A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*, EPA 540-F-00-005, OSWER 9355.0-784FS-P, EPA, Office of Solid Waste and Emergency Response, September.

FIU (Florida International University), 2002. *2006 and Beyond: Defining Long-Term Stewardship Requirements at Fernald*, Florida International University, Miami, Florida, November.

GeoSyntec, 2006. *Work Plan for Removal and In-place Abandonment of the OSDF Cell 1 Final Cover Monitoring System*, prepared for Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio, March.

GeoSyntec, 1997. *Final Design Calculation Package; On-site Disposal Facility*, Volume 1, Revision 0, prepared for Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, May.

ICF (ICF Kaiser Consulting Group), 1998. *Managing Data for Long-Term Stewardship*, Working Draft, prepared for Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio, March.

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